

CLAIMS

1. A method for fixing a metal particle, including:
 - forming a resist film containing a resin component and a metal-containing particle on a substrate; and
 - removing said resin component in said resist film and fixing

5 a metal particle on said substrate, said metal particle including a metallic element that composes said metal-containing particle.
2. The method for fixing the metal particle according to claim 1, wherein said metal-containing particle is a metallic compound.
3. The method for fixing the metal particle according to claim 2, further including heating said resist film to a temperature of 300 degree C or higher and 1,200 degree C or lower within an inert gas atmosphere or a vacuum, after said forming the resist film and

5 before said removing said resin component and fixing said metal particle.
4. The method for fixing the metal particle according to any one of claims 1 to 3, wherein said removing said resin component and fixing said metal particle includes exposing said resist film to a plasma atmosphere.
5. The method for fixing the metal particle according to any one of claims 1 to 4, wherein said removing said resin component and fixing said metal particle includes heating to a temperature of 300

degree C or higher and 1,200 degree C or lower within an oxygen gas
5 atmosphere.

6. The method for fixing the metal particle according to any one of claims 1 to 5, wherein said resist film is a negative-type resist film.

7. The method for fixing the metal particle according to any one of claims 1 to 6,

wherein said resist film is formed so as to cover the region where said metal particle is to be fixed, and

5 wherein said metal-containing particles in said resist film are aggregated to fix said metal particle to said region.

8. The method for fixing the metal particle according to any one of claims 1 to 7, further comprising providing an electrode so as to contact with said metal particle, after fixing said metal particle.

9. The method for fixing the metal particle according to any one of claims 1 to 7,

wherein an electrode is provided on a surface of said substrate, and

5 wherein said fixing the metal particle includes aggregating the metal-containing particles in said resist film to fix said metal particle on a surface of said electrode.

10. The method for fixing the metal particle according to claim 7

or claim 9, wherein said metal particle is one and is fixed.

11. The method for fixing the metal particle according to any one of claims 1 to 10, further including:

forming a diffusion barrier film on said substrate, before said forming the resist film, and

5 wherein said fixing the metal particle on said substrate includes fixing said metal particle on said diffusion barrier film.

12. A method for fixing a metal particle, including:

forming a pattern containing a metal component by irradiating charged particle beam onto a substrate within an organic molecular gas atmosphere containing organometallic molecule to deposit a 5 decomposition product of said organic molecular gas containing said metal component in the region where the charged particle beam is irradiated; and

removing the organic constituent in said pattern and fixing a metal particle containing said metal component on said substrate.

13. The method for fixing the metal particle according to claim

12, further including heating said pattern to a temperature of 300

degree C or higher and 1,200 degree C or lower within an inert gas

atmosphere or a vacuum, after said forming the pattern containing

5 the metal component and before said fixing the metal particle on the substrate.

14. The method for fixing the metal particle according to claim

12 or 13, wherein said removing the organic compound constituent in the pattern and fixing the metal particle includes exposing said pattern to a plasma atmosphere.

15. The method for fixing the metal particle according to any one of claims 12 to 14, wherein said removing the organic constituent in the pattern and fixing the metal particle includes heating said pattern to a temperature of 300 degree C or higher and 1,200 degree 5 C or lower within an oxygen gas atmosphere.

16. The method for fixing the metal particle according to any one of claims 12 to 15,

wherein said pattern is formed so as to cover the region where said metal particle is to be fixed, and

5 wherein said metal-containing particles in said pattern is aggregated to fix said metal particle to said region.

17. The method for fixing the metal particle according to any one of claims 12 to 16, further including:

providing an electrode so as to contact with said metal particle, after fixing said metal particle.

18. The method for fixing the metal particle according to any one of claims 12 to 16,

wherein an electrode is provided on a surface of said substrate, and

5 wherein said fixing the metal particle includes aggregating

the metal-containing particles in said resist film to fix said metal particle on a surface of said electrode.

19. The method for fixing the metal particle according to claim 16 or claim 18, wherein said metal particle is one and is fixed.

20. A method for manufacturing a metal particle-containing substrate, including the method for fixing the metal particle according to any one of claims 1 to 19.

21. A method for manufacturing a substrate containing carbon nanotube on a surface thereof, including:

fixing a metal particle on the substrate; and
allowing a growth of a carbon nanotube by a vapor deposition
5 process with a catalyst of said metal particle,
wherein said fixing said metal particle is conducted by the
method for fixing the metal particle according to any one of claims
1 to 19.

22. A method for manufacturing a substrate containing a carbon nanotube on a surface thereof, including:

fixing a metal particle on the substrate;
disposing an amorphous carbon resin so as to cover said metal
5 particle; and
transferring said metal particle in said amorphous carbon
resin by heating said substrate having said amorphous carbon resin
disposed thereon to allow the growth of the carbon nanotube in a

region where said metal particle is transferred to form a locus,
10 wherein said fixing said metal particle is conducted by the
method for fixing the metal particle according to any one of claims
1 to 19.

23. A method for manufacturing a substrate containing a
semiconductor crystal rod on a surface thereof, including:
fixing a metal particle on the substrate; and
allowing a growth of a crystalline rod of a semiconductor by
5 a vapor deposition process with a catalyst of said metal particle,
wherein said fixing said metal particle is conducted by the
method for fixing the metal particle according to any one of claims
1 to 19.